## AMENDMENTS TO THE CLAIMS

1-33. **(Cancelled)**

34. (New) An appliance for expanding a palatal arch of a patient while repositioning teeth, the appliance comprising:

a first portion of the arch expander;

a second portion of the arch expander;

the first and second portion each having a plurality of cavities for receiving posterior teeth on one side of the palate and a palatal portion extending toward a centerline of the palate, the plurality of cavities forming a geometry shaped according to at least one digital image that captures at least some of the patent's teeth, the plurality of cavities to receive the patient's posterior teeth, to secure the appliance to the patient, and to resiliently reposition teeth from one tooth arrangement to a successive tooth arrangement;

an expansion member coupled between the first and second portions, the member to adjust the spacing between the first and second portions on a periodic basis, to expand the palatal arch while repositioning the teeth with a successive arrangement of the plurality of cavities.

35. (New) The appliance of claim 34, wherein the expansion member comprises one or more screws.

36. (New) The appliance of claim 34, wherein the expansion member comprises one or more springs.

37. (New) The appliance of claim 34, wherein the first and second portions comprise super-elastic nitinol.

38. (New) The appliance of claim 34, wherein the first and second portions are fabricated using stereolithography, fused deposition modeling, 3-D printing, or selective laser sintering.

39. (New) The appliance of claim 34, wherein appliance is removably replaceable over the patient's teeth.

40. (New) A method for expanding a palatal arch of a patient while repositioning teeth, the method comprising:

acquiring at least one digital image representing at least a portion of upper teeth and a palate of the patient;

fabricating a first portion of an appliance with a palatal arch expander;

fabricating a second portion of the arch expander;

the first and second portion each having a plurality of cavities for receiving posterior teeth on one side of the palate and a palatal portion extending toward a centerline of the palate, the plurality of cavities forming a geometry shaped according to at least one digital image that captures at least some of the patent's teeth, the plurality of cavities to receive the patient's posterior teeth, to secure the appliance to the patient, and to resiliently reposition teeth from one tooth arrangement to a successive tooth arrangement;

coupling an expansion member between the first and second portions;

placing the arch expander in the patient's mouth; and

adjusting the expansion member on a periodic basis to vary the spacing between the first and second portions to expand the patient's palatal arch while repositioning the teeth with a successive arrangement of the plurality of cavities.

41. (New) The method of claim 40, wherein the first and second portions are fabricated using stereolithography, fused deposition modeling, 3-D printing, or selective laser sintering.

42. (New) The method of claim 40, wherein acquiring the at least one image comprises intra-oral scanning.

43. (New) The method of claim 40, wherein acquiring the at least one image comprises:

taking an impression of the patient's teeth;

placing the impression in a scanner; and

generating data for a 3D model of the impression.

44. (New) The method of claim 43, wherein data associated with the three-dimensional model is compressed.

45. (New) The method of claim 43, wherein the taking of an impression of the patient's teeth is done by a treating professional, and the placing of the impression in a scanner and the generating a 3D model of the impression are done by an appliance provider.